

STATE OF WASHINGTON  
DEPARTMENT OF NATURAL RESOURCES

ROAD PLAN

Name of Sale Impulse

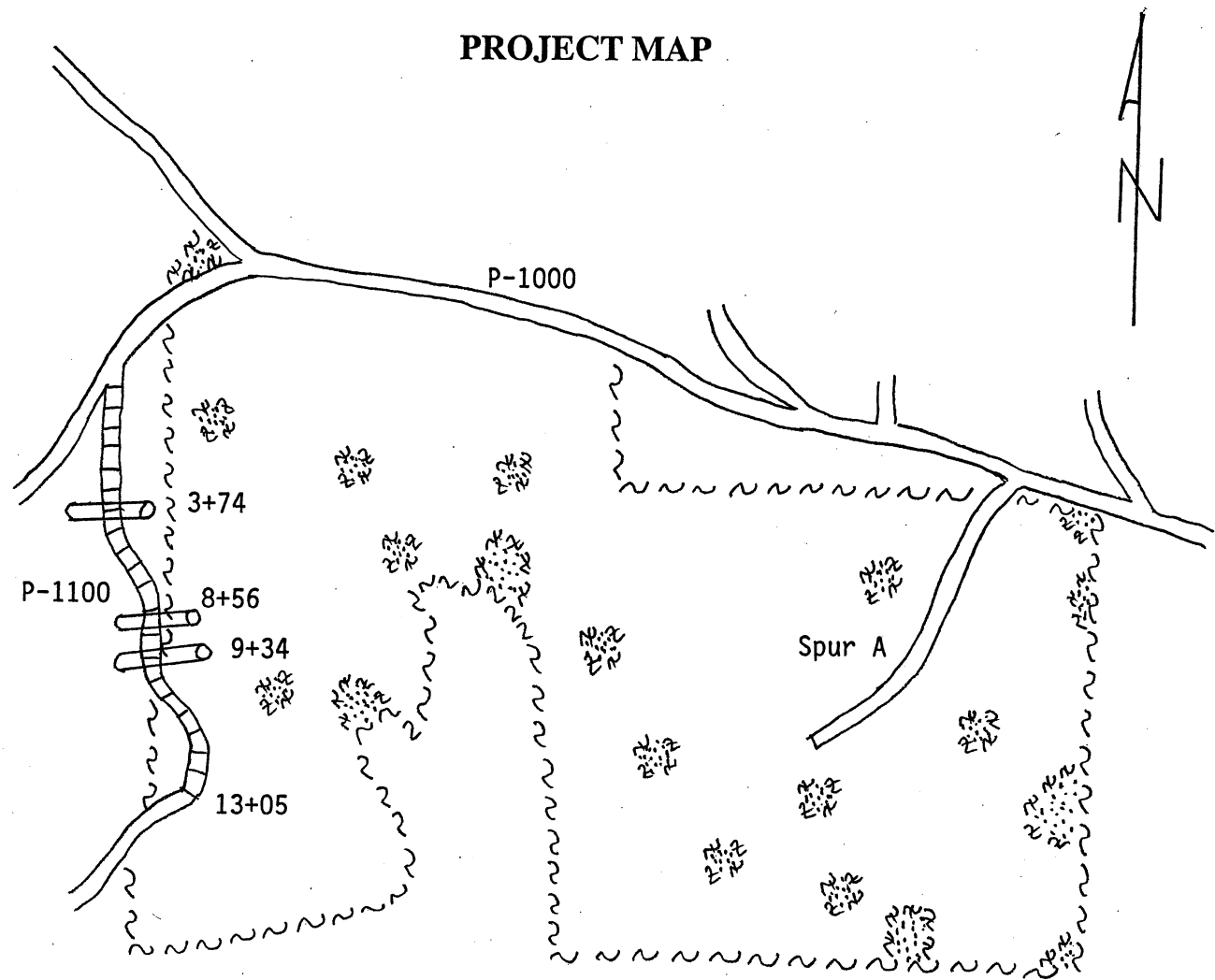
Pacific Cascade Region

Application No. 76367

County Cowlitz

Section 7 Township 10 North, Range 2 West, W.M.

PROJECT MAP



Legend

- Existing Roads
- Required Reconstruction
- Culverts
- Sale Boundary tags
- Leave Tree Areas

Scale: 1" = 500'

Date: 6/10/04

Road Plan

Sheet 1 of 13

**ROAD PLAN**

SALE NAME: Impulse

ROAD PLAN DATE: 06/10/2004

**SECTION 1 - GENERAL CLAUSES**

1.1-1  
Clauses in this plan apply to all construction or reconstruction or pre-haul maintenance including landings unless otherwise noted.

1.1-2  
Construction or reconstruction or pre-haul maintenance of the following road/s is required. All roads shall be constructed or reconstructed or pre-hauled maintained on the State's location and in accordance with this Road Plan.

<u>Road</u>	<u>Length</u>	<u>Type</u>
P-1000	1.25 miles	Pre-haul maintenance
P-1100	0+00 to 13+05	Reconstruction

Pre-haul maintenance consists of cleaning ditches and culverts, grading, and compacting the road surface. Compaction shall be by vibratory Elliot grid weighing at least 20,000 pounds. At least four complete passes at a maximum speed of 10 mph shall be made on each lift.

1.1-4  
If the Purchaser desires a road location or design change, a written request shall be submitted to the State for consideration.

1.1-5  
On this plan quantities are minimum acceptable values. Additional quantities required by the State because of hidden conditions or Purchaser's choice of construction season or techniques shall be at the Purchaser's expense. Hidden conditions include, but are not limited to: solid subsurface rock, subsurface springs, saturated ground, and unstable soil.

1.2-1  
The construction or reconstruction or pre-haul maintenance of all roads specified herein shall not be permitted between November 1 and April 30 unless authority to do so is granted, in writing, by the Contract Administrator.

1.2-2  
Purchaser shall not use roads constructed or reconstructed or pre-haul maintained under this Road Plan for hauling, other than timber cut on the right-of-way, without written approval from the Contract Administrator.

1.2.1-1  
Pioneering shall not extend past construction that will be completed during the current construction season. Drainage shall be provided on all uncompleted construction as approved, in writing, by the Contract Administrator.

Clearing and grubbing shall be completed prior to starting excavation and embankment.

Culvert placement in live streams shall precede embankment where culverts are to be placed along natural ground.

Culverts shall be installed in completed subgrade as construction progresses.

Subgrade, ditches, and culvert installations shall be completed and are subject to written approval by the Contract Administrator prior to rock application.

## **ROAD PLAN**

**SALE NAME:** Impulse

**ROAD PLAN DATE:** 06/10/2004

1.5-1

Maintenance on roads listed in Contract Clauses C-50 (Purchaser Road Maintenance and Repair) and C-60 (Designated Road Maintainer) shall be performed in accordance with Forest Access Road Maintenance Specifications.

1.5-3

Snowplowing will be permitted only after execution of a "Snow Plowing Agreement", which is available from the contract administrator upon request.

## **SECTION 2 - CLEARING**

2.1-1

Fell all vegetative material larger than 6 inches DBH or over 20 feet high between the marked right-of-way boundaries and within waste areas or if not marked in the field, between clearing limits specified on TYPICAL SECTION SHEET.

2.1-3

Right-of way timber shall not be decked within the grubbing limits or in locations that interfere with construction of the road prism or impede drainage.

## **SECTION 3 - GRUBBING**

3-1

All stumps shall be removed that fall between grubbing limits shown on the TYPICAL SECTION SHEET. Those outside the grubbing limits but with undercut roots shall also be removed. Stumps over 22 inches diameter shall be split. Stumps over 40 inches shall be quartered.

3-2

Grubbing limits are defined as the entire area between the external limits shown on the TYPICAL SECTION SHEET.

## **SECTION 4 - DEBRIS DISPOSAL AND REMOVAL**

4.1-1

Right-of way debris is defined as all vegetative material larger than one cubic foot in volume, within the clearing limits

4.2.3-3

Right-of-way debris shall not be placed against standing timber.

4.2.3-4

Right-of-way debris shall be scattered outside the grubbing limits.

## **SECTION 5 - EXCAVATION**

5.1-1

Unless controlled by construction stakes or specific design sheets herein, roads shall be constructed or reconstructed in accordance with dimensions shown on the TYPICAL SECTION SHEET.

**ROAD PLAN**

SALE NAME: Impulse

ROAD PLAN DATE: 06/10/2004

5.1-3

Road grade and alignment shall conform to the State's marked location. Grade and alignment shall have smooth continuity without abrupt changes in direction. Maximum grades are 18 percent favorable and 12 percent adverse or as specified on drawings. Minimum radius curve is 60 feet.

5.1-8

Excavation slopes shall be constructed no steeper than shown on the following table (except as construction staked or designed.):

<u>Material Type</u>	<u>Excavation Slope Ratio</u>
Common Earth (on side slopes of 55%) .....	1:1
Common Earth (55% to 70% sideslopes) .....	3/4:1
Common Earth (on slopes over 70%) .....	1/2:1
Fractured or loose rock .....	1/2:1
Hardpan or solid rock.....	1/4:1

5.1-9

Excavation and embankment slopes shall be constructed to a uniform line and left rough for easier revegetation.

5.1-10

Embankments shall be widened as follows:

<u>Height at Centerline</u>	<u>Subgrade Widening</u>
Less than 6 feet	2 feet
6 feet or over	4 feet

5.1-11

Embankment slopes shall be constructed no steeper than shown on the following table:

<u>Material Type</u>	<u>Embankment Slope Ratio</u>
Common Earth and Rounded Gravel .....	11/2:1
Angular Rock .....	11/4:1
Sandy Soils. ....	2:1

5.1-12

Organic material shall be excluded from embankment and from waste material deposited on slopes in excess of 40 percent.

5.1-14

Where side slopes exceed 45 percent, full bench construction shall be utilized for the entire subgrade width .

5.1-15

Waste material may be deposited adjacent to the road prism on side slopes up to 45 percent if the waste material is compacted and more than 50 feet away from live streams. On side slopes over 45 percent, all excavation shall be end hauled or pushed to designated embankment sites. All waste embankments shall be compacted in horizontal layers not exceeding 2 feet.

5.1-21

Waste material shall not be deposited within 50 feet of a live stream.

5.2-1

Road pioneering operations shall not undercut the final cut slope, deposit excavated material outside the right-of-way limits, or restrict drainage.

**ROAD PLAN**

SALE NAME: Impulse

ROAD PLAN DATE: 06/10/2004

5.3-1

All embankment and waste material shall be compacted. The minimum acceptable compaction is achieved by placing embankments in 2 foot or shallower lifts and routing excavation equipment over entire width of the lifts. Side hill embankments too narrow to accommodate excavation equipment may be placed by end-dumping or side casting until sufficiently wide to support the equipment.

5.4-1

Silt-bearing runoff shall not be permitted to go into streams.

5.4-2

Accomplish sediment removal through silt traps, silt fences, settling ponds, or other methods as approved, in writing, by the Contract Administrator.

5.4-3

Purchaser shall furnish and evenly spread the seed and fertilizer mixture listed below on all exposed soil inside the grubbing limits at a rate of 40 pounds per acre. The date of application is subject to approval by the Contract Administrator.

<u>Mixture Percent by Weight</u>	<u>Minimum Percent Germination</u>
50% Fescue, Red	90% Germination
25% Ryegrass, Perennial	90% Germination
15% Bentgrass	85% Germination
10% Clover, White	90% Germination

Weed seed shall not exceed 0.5% by weight.

Fertilizer shall be applied at the rate of 100 pounds per acre and shall consist of 16-16-16 or other approved balanced mix.

5.5-5

Finished subgrade shall be crowned as shown on the TYPICAL SECTION SHEET, and shall be uniform, firm, rut-free, and shaped to ensure surface runoff in an even, unconcentrated manner.

**SECTION 6 - DRAINAGE**

6.2.1-1

Purchaser shall furnish, install, and maintain galvanized culverts meeting AASHTO M-36 or corrugated polyethylene pipe meeting AASHTO specification No. M-294-S as designated on the CULVERT LIST. Culvert and flume lengths shall be varied to fit as-built conditions subject to written approval by the Contract Administrator. Refer to Hydraulic Project Approval/s for applicable culvert installations.

6.2.1-2

Annular corrugated bands and culvert ends shall be used on metal culverts. On culverts 24 inches and smaller, bands shall have a minimum width of 12 inches; on culverts over 24 inches, bands shall have a minimum width of 24 inches. Manufacturer's approved connectors shall be used for corrugated polyethylene pipe.

6.2.1-5

On required roads: culverts, downspouts, flumes, bands, and gaskets as listed on the CULVERT LIST which are not installed shall become property of the State. Purchaser shall stockpile materials as directed by the contract administrator.

6.2.2.1-1

Culvert, downspout, flume, and energy dissipator installation shall be in accordance with CULVERT AND DRAINAGE SPECIFICATION DETAIL. Touch up damaged galvanized coating with 2 coats of zinc rich paint.

**ROAD PLAN**

SALE NAME: Impulse

ROAD PLAN DATE: 06/10/2004

6.2.2.3-1

Cross drains and surface culverts on road grades in excess of 3% shall be skewed at least 30 degrees from perpendicular to the road centerline , except that cross drain culverts at the low points of dips in roads shall not be skewed.

6.2.2.3-2

Cross drain culverts shall be installed at a slope steeper than the incoming ditch grade, but not less than 3% nor more than 10%.

6.2.2.5-1

Drainage structure outfalls shall not terminate directly on unprotected soil that will erode. Downspouts, flumes, and energy dissipators shall be installed to prevent erosion.

6.3-1

Ditches shall be constructed concurrently with construction of the subgrade. Ditches shall drain to culverts, ditchouts, and natural drainages.

6.5-1

Headwalls shall be constructed in accordance with CULVERT AND DRAINAGE SPECIFICATION DETAIL at all cross drain culverts except for temporary culverts.

**SECTION 7 - ROCK**

7.1-3

Rock for construction or reconstruction under this contract shall be from commercial sources. Rock sources will be subject to written approval by the contract administrator prior to rock placement on roads.

7.2.1-4

4 INCH MINUS JAW RUN rock shall meet the following specifications for gradation:

% equal to, or smaller in one dimension  
than the specified size ..... 100%

All percentages are by weight.

7.2.1.2-2

Rock shall contain no more than 5 percent by weight of vegetative debris, dirt, or trash.

7.2.3-1

Measurement of rock shall be on a cubic yard truck measure basis. The Purchaser shall provide and maintain load tally sheets for each truck and shall give them to the Contract Administrator upon request.

7.4.2-1

Apply at least the minimum required rock quantity as shown on ROCK LIST.

7.4.2-2

On Required roads subgrade shall be approved, in writing, by the Contract Administrator prior to application of rock.

7.4.2-8

Each lift of rock shall be crowned as shown on TYPICAL SECTION SHEET, and shall be uniform, firm, rut-free, and shaped to ensure surface runoff in an even, unconcentrated manner.

STATE OF WASHINGTON  
DEPARTMENT OF NATURAL RESOURCES

**ROAD PLAN**

**SALE NAME:** Impulse

**ROAD PLAN DATE:** 06/10/2004

7.4.3-2A

Rock shall be spread and compacted full width. Compaction shall be by vibratory Elliot grid weighing at least 20,000 pounds. At least four complete passes at a maximum speed of 10 mph shall be made on each lift.

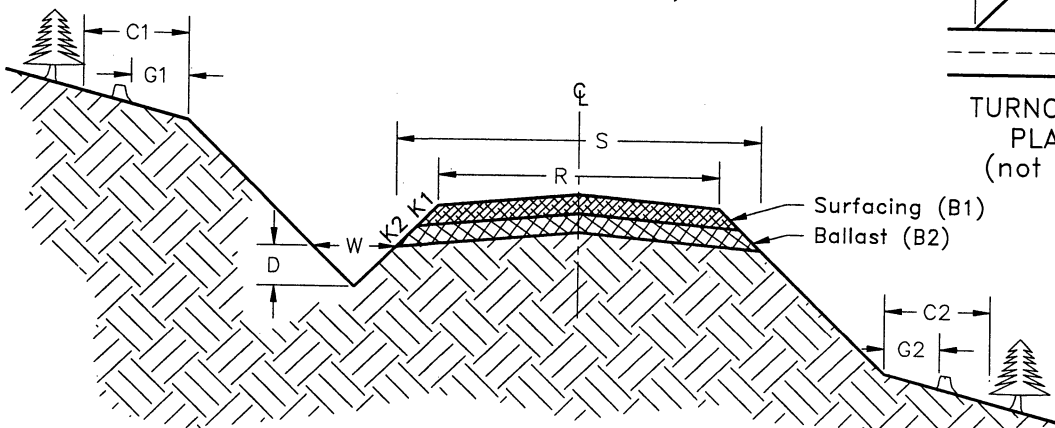
**SECTION 9 - ROAD AND LANDING CLOSURES**

9.2-1

After harvest operations are completed, Purchaser shall remove all landing debris. Haul all material to waste site as designated by Contract Administrator. Restore access to powerline road.

## ROAD PLAN

ROAD PLAN DATE: 06/10/2004



# TYPICAL SECTION SHEET

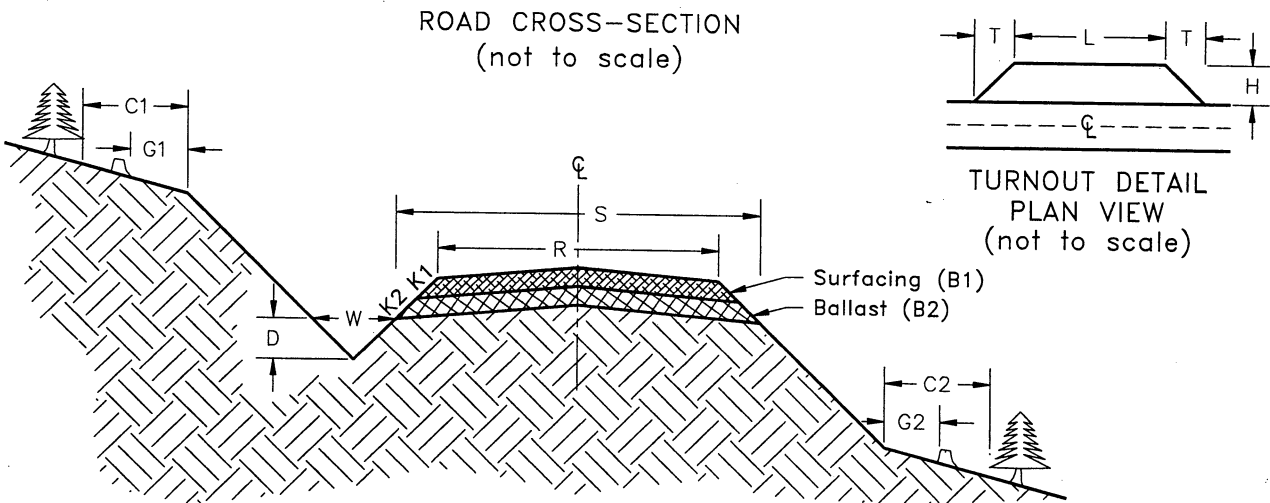
[illegible]



ROAD PLAN

SALE NAME: Impulse

ROAD PLAN DATE: 06/10/2004



ROCK LIST

4 INCH JAW RUN BALLAST

Road Number	From Station	To Station	Rock Slope	Rock Depth	C.Y./ Station	# of Stations	C.Y. Subtotal	Rock Source	Turnout		
									Length	Width	Taper
			K2	B2					L	H	T
P-1100	0+00 Landing	13+05		15"	67	13.05	874 50	Commercial Commercial			

BALLAST TOTAL 924 Cubic Yards

SURFACING

Road Number	From Station	To Station	Rock Slope	Rock Depth	C.Y./ Station	# of Stations	C.Y. Total	Rock Source
			K1	B1				

SURFACE TOTAL \_\_\_\_\_ Cubic Yards

## ROAD PLAN

ROAD PLAN DATE: 06/10/2004

[illegible]

SR - Shot Rock  
NT - Native (bank run)  
SL - Select Fill  
HL - Heavy Loose Riprap  
LL - Light Loose Riprap  
Flume - Half round pipe  
Downspout - Full round pipe

Road Surface

Minimum 12"

BEDDING MATERIAL:

Materials of poor or non-uniform bearing capacity shall be removed and replaced with suitable fill.

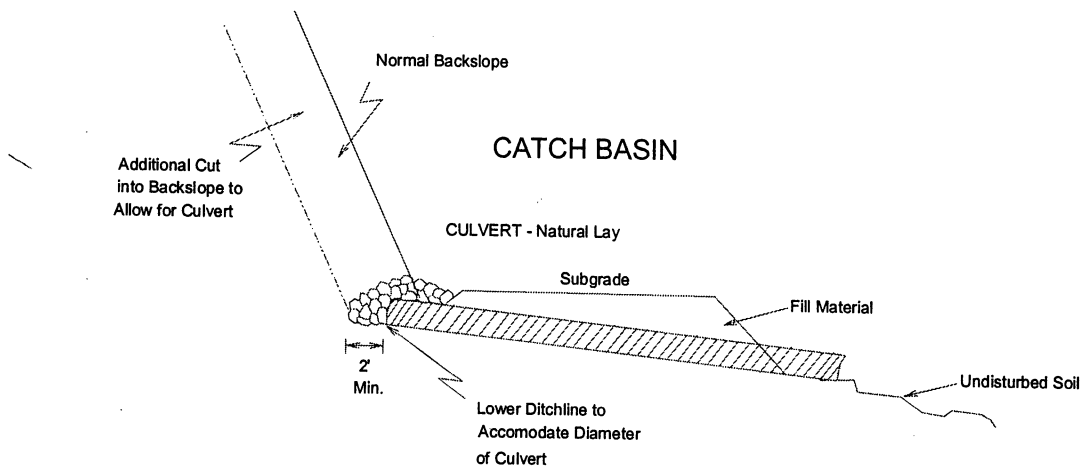
**ROAD PLAN**

SALE NAME: Impulse

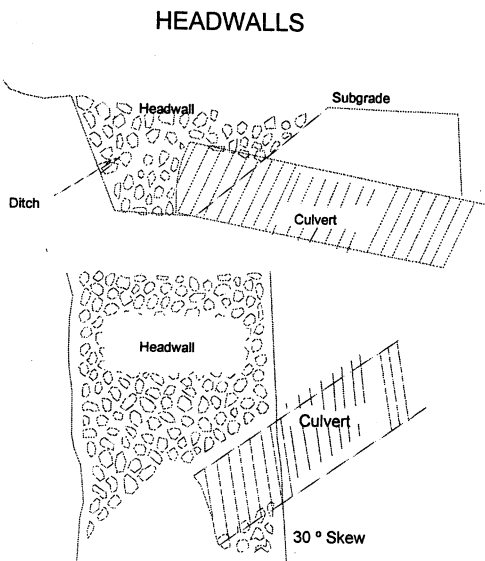
ROAD PLAN DATE: 06/10/2004

**CULVERT AND DRAINAGE SPECIFICATION DETAIL**

(Page 1 of 2)

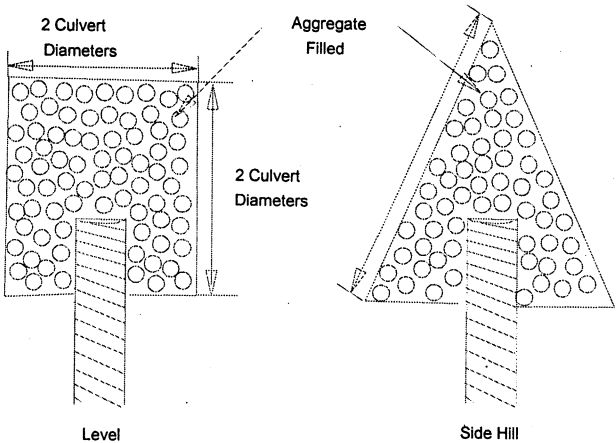


Proper preparation of foundation and placement of bedding material shall precede the installation of all culvert pipe. This includes necessary leveling of the native trench bottom and compaction of required bedding material to form a uniform dense unyielding base. The backfill material shall be placed so that the pipe is uniformly supported along the barrel.



Headwalls to be constructed of material that will resist erosion.

**ENERGY**



Dissipator Specifications:  
Depth: 1 culvert diameter  
Aggregate: as specified in the CULVERT LIST.

**ROAD PLAN**

SALE NAME: Impulse

ROAD PLAN DATE: 06/10/2004

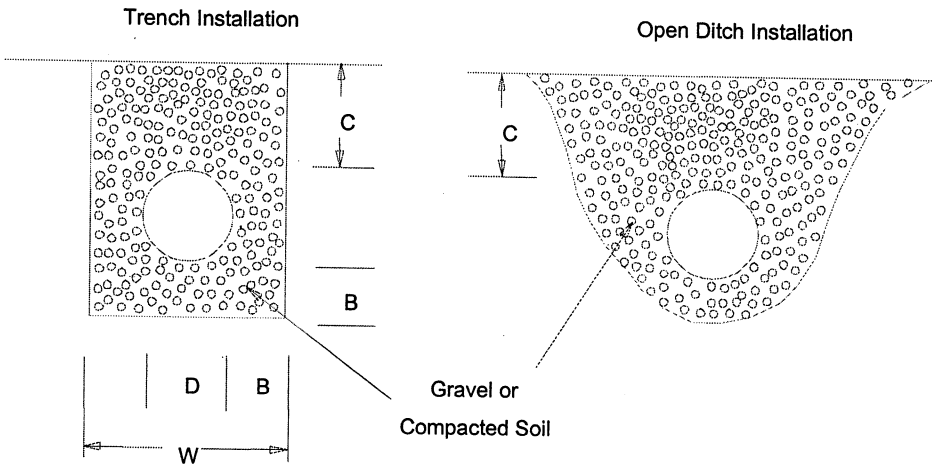
**CULVERT AND DRAINAGE SPECIFICATION DETAIL**

(Page 2 of 2)

**POLYETHYLENE PIPE INSTALLATION**

**INSTALLATION REQUIREMENTS:**

1. Crushed stone, gravel, or compacted soil backfill material shall be used as the bedding and envelope material around the culvert. The aggregate size shall not exceed 1/6 pipe diameter or 4" diameter, whichever is smaller.
2. The corrugated pipe shall be laid on grade, on a layer of bedding material as shown for the two types of installations. If native soil is used as the bedding and backfill material, it shall be well compacted in six inch layers under the haunches, around the sides and above the pipe to the recommended minimum height of cover.
3. Either crushed aggregate or flexible (asphalt) pavement may be laid as part of the minimum cover requirements.
4. Site conditions and availability of bedding materials often dictate the type of installation method used.
5. The load bearing capability of flexible conduits is dependent on the type of backfill material used and the degree of compaction achieved. Crushed stone and gravel backfill materials typically reach a compaction level of 90-95% AASHTO standard density without compaction. When native soils are used as backfill material, a compaction level of 85% is required. This minimum compaction can be achieved by either hand or mechanical tamping.



**MINIMUM DIMENSIONS**  
Trench or Open Ditch Installation

Nominal Diameter	Minimum Thickness	Minimum Cover	Min. Trench Width
D	B	C	W
18"	6"	12"	36"
24"	6"	12"	42"
30"	6"	12"	48"
36"	6"	12"	54"

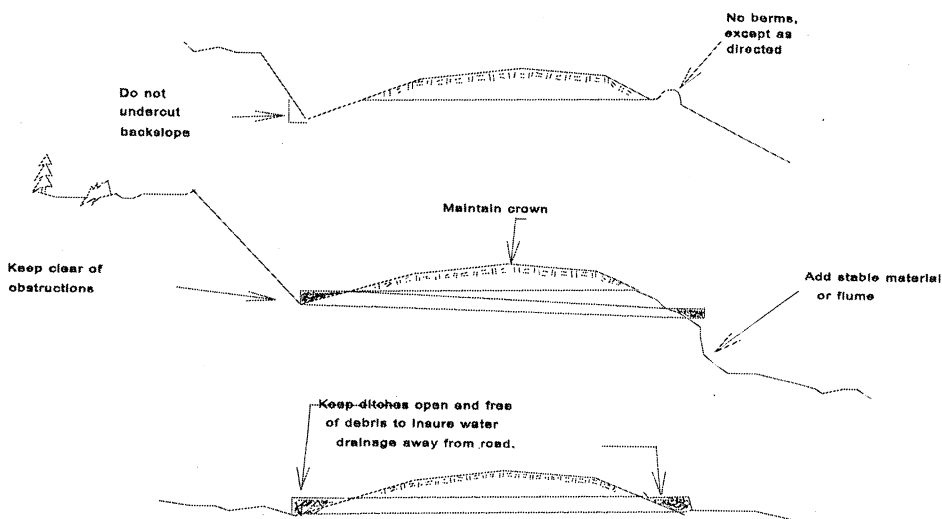
**ROAD PLAN**

SALE NAME: Impulse

ROAD PLAN DATE: 06/10/2004

**FOREST ACCESS ROAD  
MAINTENANCE SPECIFICATIONS**

1. **CONSTRUCTION AND RECONSTRUCTION** (Prior to acceptance to the contract or acceptance on a timber sale).
- A. Cuts and Fills
1. Maintain slope lines as constructed. Remove slides from the ditches and roadway. Replace fills to 11/2:1 slopes with selected material or as directed. Remove overhanging material from the cut slopes.
  2. Material from slides or other sources requiring removal shall not be deposited in streams or at locations where it will erode into streams or water courses.
  3. Undesirable slide materials and debris shall not be mixed into the surface material.
- B. Surface
1. Grade and shape the road surface, turnouts, and shoulders to the original crown, inslope or outslope as directed to provide suitable traveled surface and surface water runoff in an even, unconcentrated manner.
  2. Blading must not undercut the backslope at the bottom of the ditchline or cut geotextile at centerline.
  3. Watering may be required to control dust and to retain fine surface rock.
  4. Desirable surface material shall not be bladed off the roadway.
  5. Replace surface material lost or worn away.
  6. Remove berms except as directed by the State.
  7. Barrel spread soft spots to prevent degradation of geotextile.
- C. Drainage
1. Keep ditches and drainage channels at outlets and inlets of culverts clear of obstructions and functioning as intended.
  2. Inspect and clean culverts at least monthly, with additional inspections during storms and periods of high runoff. This must be done even during periods of inactivity.
  3. Add stable material at the outlet end of the culvert as needed to stabilize the stream bed.
  4. Headwalls: maintain to the road shoulder level with material that will resist erosion.
  5. Keep silt bearing surface runoff from getting into live streams.
- D. Structures
- Repair bridges, culverts, cattleguards, fences, and other road structures to the condition required by the construction specifications.
- E. Termination of Use or End of Season
- Do maintenance work to minimize damage from the elements such as blading to insure correct runoff, ditch, and culvert cleaning and water bars.
- F. Debris
- Remove fallen timber, limbs, and stumps from the slopes or roadway.



ROAD COST SUMMARY

Sale Name Impulse Agr. No. 30-0 76367  
Compiled by Stan Ross Date March 29,2004

	Road Cost
Road No. <u>P-1100</u>	\$ <u>24,751.68</u>
Road No. <u>P-1000</u>	\$ <u>2,932.50</u>
Road No. _____	\$ _____
Road No. _____	\$ _____
Road No. _____	\$ _____
Total	\$ <u>27,684.18</u>

Sale Volume \_\_\_\_\_ \$/Mbf \_\_\_\_\_

ROAD COSTING FORM

Sale Name

Impulse

Agr. No. 30- 76367

Road No.

P-1100

Compiled by

Stan Ross

Date

March 29,2004

No. of Stations

13.05

R/W Width

CLEARING & GRUBBING

	Cat days:		@	\$	=	\$	
	Excavator days	1	@	\$	1000.00	=	\$ 1000.00
	Revegetation:	13	@	\$	20.00	=	\$ 260.00
							\$ 1,260.00

EXCAVATION

	Cat days:	1	@	\$	1000.00	=	\$ 1000.00
	Excavator days		@	\$		=	\$
	Endhaul volume		@	\$		=	\$
							\$ 1,000.00

BALLAST & SURFACING

Depth	yds/sta	X	stations	=	yards

Ballast Source:

Commercial

Surface Source:

Riprap Source:

UNIT COSTS	Ballast	Surfacing	Riprap
Drill & shoot			
Dig & load			
Purchase	13.00		
Haul	3.00		
Spread	0.30		
Compact	0.50		
Strip/Reclaim			
Crush			
Total	16.80		

Ballast	924	yds @ \$	16.80	/yds = \$	15523.20
Surface		yds @ \$		/yds = \$	
Riprap		yds @ \$		/yds = \$	
					\$ 15,523.20

CULVERTS & FLUMES

G-(Galvanized)P-(Plastic)ED-(energy dissipator)F-(flume)

Diam.	No.	Ga.	Type	Length	Cost/ft	Total
18"	3	16	G	96	15.00	1440.00

\$ 1,440.00

ABANDONMENT

	Excavator days	0.5	@	\$	1000.00
			@	\$	
					\$ 500.00

OTHER

MOVE IN	Dozer	@	\$	500.00
	Excav.	@	\$	500.00
	Roller	@	\$	500.00
	Trucks	@	\$	300.00
				\$ 1800.00

Cost per Station \$ 1896.68

GENERAL EXPENSES	Subtotal \$	21,523.20	Subtotal X 1.15%	Total \$	24,751.68
------------------	-------------	-----------	------------------	----------	-----------

---

No. of Stations 66 R/W Width                     

Cat days:		@	\$	=	\$	
Excavator days	0.75	@	\$	1000.00	=	\$ 750.00
Revegetation:		@	\$		=	\$
						\$ 750.00

<u>          </u> Cat days:	<u>          </u>	@	\$	<u>          </u>	=	\$	<u>          </u>	
<u>          </u> Excavator days	<u>          </u>	@	\$	<u>          </u>	=	\$	<u>          </u>	
<u>Endhaul volume</u>	<u>          </u>	@	\$	<u>          </u>	=	\$	<u>          </u>	
	<u>          </u>			<u>          </u>			<u>          </u>	\$ <u>          </u>

[illegible]

UNIT COSTS	Ballast	Surfacing	Riprap
Drill & shoot			
Dig & load			
Purchase			
Haul			
Spread			
Compact			
Strip/Reclaim			
Crush			
Total			

Ballast Source: \_\_\_\_\_  
Surface Source: \_\_\_\_\_  
Riprap Source: \_\_\_\_\_

Ballast	_____ yds @ \$ _____ /yds = \$ _____	
Surface	_____ yds @ \$ _____ /yds = \$ _____	
Riprap	_____ yds @ \$ _____ /yds = \$ _____	
		\$ _____

G-(Galvanized)      P-(Plastic)    ED-(energy dissipator)    F-(flume)

[illegible]

\_\_\_\_\_ Excavator days      \_\_\_\_\_ @ \$ \_\_\_\_\_  
 \_\_\_\_\_      \_\_\_\_\_ @ \$ \_\_\_\_\_ \$ \_\_\_\_\_

<b>OTHER</b>	Grading, shaping, crowning road	\$ 1,000.00
--------------	---------------------------------	-------------

<b>MOVE IN</b>	Grader	@	\$	500.00	
	Roller	@	\$	300.00	
		@	\$		
		@	\$		
		@	\$		
					\$ 800.00

Cost per Station    \$ 44.43

<b><u>GENERAL EXPENSES</u></b>	Subtotal \$ 2550.00	Subtotal X 1.15%	Total \$ 2,932.50
--------------------------------	---------------------	------------------	-------------------